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Empirical Study of the Correlation between Social Media Content and Health Issues among College Students Using Machine Learning

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Abstract

This study analyzes the effect of social media content on college student addiction using data science techniques. It aims to examine the correlation between different types of social media content and addictive behavior in college students. The research methodology used is non-probability sampling with a sample size of 587 college students in Tamil Nadu, India. The study uses statistical tools such as correlation analysis, regression analysis, one-way ANOVA, and Friedman ranking test to analyze the data collected. The findings suggest that the factors influencing social media addiction are positively correlated with the health issues faced by college students. The study indicates that demographic variables such as age, gender, year in college, and place of living may play a role in shaping an individual's perception of social media addiction. The results of the study can inform the development of interventions and prevention strategies to reduce social media addiction among college students. The study recommends a multi-pronged approach to address the root causes of addiction and provide students with the tools and resources they need to manage their social media use and promote their physical and mental health.

Keywords: Social Media Addiction, College Students, Social Media Content, Health Issues, Correlation, Regressing Analysis, Inclusive Health, Health Risks

1. Introduction

Social media has become an integral part of our daily lives. It has revolutionized communication and brought about new opportunities for socialization and networking. However, social media use has been associated with addiction, which can have negative impacts on an individual's mental health and overall well-being. In particular, college students are among the most affected by social media addiction due to their heavy use of technology and the internet. This study aims to analyze the effect of social media content on college student addiction using data science techniques. The study will examine the correlation between different types of social media content (such as text, images, and videos) and addictive behavior in college students. Several previous studies have explored the relationship between social media use and addiction, highlighting the negative impacts of excessive social media use on mental health, academic performance, and social relationships [1], [2]. Additionally, other studies have investigated the role of specific social media platforms and their addictive properties, such as Instagram [3] and Snapchat [4].

Data science techniques, such as machine learning algorithms and data mining, will be used to analyze large datasets of social media content and user behavior. The study will utilize publicly available data from social media platforms, as well as survey data from college students, to identify patterns and correlations between social media use and addiction. The findings of this study will contribute to the vast research on social media addiction and its impact on college students. Furthermore, the study may inform the development of interventions and prevention strategies to reduce social media addiction among college students.

Personal relevance criteria for social media addiction are how relevant social media content is to an individual. Friends and family content, interest-based content, personal information, nostalgia, location-based content, and user-generated

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content can affect this. Personal relevance can lead to social media addiction since people are more likely to connect with relevant content. Knowing these elements can help build successful college student social media addiction therapies [5].

Social media content's emotional impact causes social media addiction. Emotional contagion, viral content, shock value, positive, negative, and user-generated emotional content might affect this. Emotional content is more engaging hence it might lead to social media addiction. Emotional contagion and viral content increased social media addiction, according to [6]. Knowing these elements can help build successful college student social media addiction therapies. FOMO occurs when people feel left out of enjoyable experiences. Due to continual social media updates, FOMO can worsen. Social comparison, updates, availability bias, group engagement, and peer pressure can cause FOMO. Knowing these aspects can help create social media addiction therapies and improve mental health [7].

Social affirmation can cause social media addiction. This is related to social media validation, such as likes, comments, and follows. It's also linked to social standing, in-group membership, self-esteem, and comparison to others. Social validation predicted Facebook addiction in young adults, according to [8]. Knowing this can help create social media addiction therapies. Novelty influences college students' social media addiction. Social media's constant stream of tailored and user-generated material makes it exciting and fresh. Social media networks add new features to keep people engaged, which contributes to freshness. Addiction is fueled by social media's promise of fresh experiences [9]. Notification and reward systems fuel social media addiction. Push notifications, incentive systems, gamification, reinforcement schedules, endorsements, and recommendations keep social media users hooked. These systems engage and hook users. So, people grow addicted to social media since they use it daily. These factors can inform social media addiction interventions [10].

Previous research has investigated the relationship between social media use and addiction, with several studies suggesting that excessive social media use can lead to addiction [11], [12], [13]. However, there is limited research on the impact of social media content on addiction. One study conducted by Chen and colleagues [14] used machine learning to analyze social media posts and found that negative emotions expressed on social media were positively associated with social media addiction. Another study by Li and colleagues [15] found that visual features such as the number of likes and comments on social media posts were positively associated with social media addiction. These studies suggest that the content of social media posts may have an impact on addiction, but more research is needed to understand the relationship between social media content and addiction.

Another study by Chen et al. [16] found that social media use among college students was positively associated with increased levels of anxiety and depression. The study revealed that increased social media use was related to higher levels of social comparison, which in turn, contributed to higher levels of anxiety and depression. These findings highlight the need for interventions that address the negative effects of social media use on mental health.

In addition, several studies have investigated the factors that contribute to social media addiction among college students. For instance, a study by Kim and Kim [9] found that the factors influencing social media addiction include novelty, social influence, self-disclosure, escapism, and mood modification. Similarly, another study by Kuss and Griffiths [17] identified several factors that contribute to social media addiction, including social interaction, impulsivity, coping, and reward sensitivity.

2. Existing Research Studies

Previous research has investigated the relationship between social media use and addiction, with several studies suggesting that excessive social media use can lead to addiction [9], [1], [16]. However, there is limited research on the impact of social media content on addiction. One study conducted by Chen and colleagues [3] used machine learning to analyze social media posts and found that negative emotions expressed on social media were positively associated with social media addiction. Another study by Li and colleagues [13] found that visual features such as the number of likes and comments on social media posts were positively associated with social media addiction. These studies suggest that the content of social media posts may have an impact on addiction, but more research is needed to understand the relationship between social media content and addiction.

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In addition, several studies have investigated the factors that contribute to social media addiction among college students. For instance, a study by Kim and Kim [11] found that the factors influencing social media addiction include novelty, social influence, self-disclosure, escapism, and mood modification. Similarly, another study by Kuss and Griffiths [7] identified several factors that contribute to social media addiction, including social interaction, impulsivity, coping, and reward sensitivity.

3. The Proposed Method

The objectives of this research are twofold. First, it aims to identify and measure the correlation between various factors that contribute to social media addiction among college students. This will be done through correlation analysis, which helps quantify the strength and direction of the relationship between variables. Secondly, the research seeks to explore the relationship between social media addiction and the health issues commonly faced by college students, using regression analysis. In this regard, specific attention is given to how social media addiction contributes to the severity of health problems, such as anxiety, sleep disorders, or physical ailments, and how these effects vary based on demographic factors like age, gender, and academic year [18], [19], [20]. To test these variations, analysis of variance (ANOVA) and the Friedman ranking test will be employed.

This comprehensive approach allows for a thorough examination of the complex dynamics between social media usage and its impact on college students' well-being, while also considering how demographic factors may influence this relationship. Ultimately, the study aims to inform targeted intervention strategies by highlighting the most influential factors contributing to addiction and health issues.

3.1. Key Concept

The research methodology employed in this study integrates advanced statistical techniques to scrutinize the interplay between social media addiction factors and consequent health concerns among college students. Initially, the study employs Pearson's correlation coefficient (r) to assess the strength and directionality of linear relationships between variables. The formula for Pearson's correlation coefficient is given by [21]:

$$r = \frac{\sum(x_i-\bar{x})(y_i-\bar{y})}{\sqrt{\sum(x_i-\bar{x})^2 \sum(y_i-\bar{y})^2}} \quad (1)$$

where *Xi* and *Yi* are the individual sample points indexed with $\overline{i}$, $\overline{X}$ and $\overline{Y}$ are the sample means of *X* and *Y* variables, respectively, and n is the number of pairs of scores. This analysis enables the identification of significant correlations between different types of social media content and addiction levels, alongside their associated health issues.

Subsequently, the study employs multiple linear regression analysis to predict the health issues based on several independent variables representing social media addiction factors. The general form of a multiple linear regression model is:

$$Y = \beta_0 + \beta_1X_1+\beta_2X_2+ \ldots + \beta_iX_i \quad (2)$$

where Y represents the dependent variable (health issues), X1, X2, …, Xn are the independent variables (factors influencing social media addiction), β0 is the y-intercept, β1, β2, …, βn are the coefficients of the independent variables, and ϵ is the error term. This analysis aids in quantifying the impact of each social media addiction factor on health issues, providing a comprehensive overview of the predictive relationships.

Lastly, to examine the variance in addiction levels based on demographic factors and to prioritize the addiction factors according to their impact, the study applies one-way ANOVA and Friedman's ranking test. The one-way ANOVA is used to test the hypothesis that two or more groups have the same population mean, and its formula is:

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$$F = \frac{MS_{between}}{MS_{within}} \quad (3)$$

Where *MSbetween* is the mean square between the group variance and *MSwithin* is the mean square within the group variance. Meanwhile, Friedman's test is a non-parametric test for identifying differences in treatments across multiple attempts. These methodologies collectively facilitate a nuanced understanding of the factors contributing to social media addiction and their effects on health, guiding the development of targeted intervention strategies. Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled [22], [23]. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you. Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

4. Results and Discussion

The following section explains the factors influencing social media addiction and health issues faced by the college students.

Null Hypothesis (H0): There is no significant correlation between the factors influencing social media addiction and the health issues faced by the college students.

The analysis presented in table 1 reveals a significant positive correlation between various factors of social media addiction and the health issues experienced by college students. The table highlights the relationships between different addiction-related factors—such as personal relevance, emotional content, fear of missing out (FOMO), social validation, novelty factor, and notification/reward systems—and their impact on health outcomes. Pearson's correlation coefficient (*r*) is used to measure the strength of these relationships, with all correlations being significant at the 0.01 level ($p < 0.01$).

Table 1. Correlations

		Personal relevance	Emotional contents	FOMO	Social Validation factor	Novelty factor	Notification and reward systems	Health Issues
Personal relevance	Pearson Correlation	1	0.784**	0.707**	0.653**	0.511**	0.405**	0.518**
	Sig. (2-tailed)		0.000	0.000	0.000	0.000	0.000	0.000
	N	581	581	581	581	581	581	581
Emotional contents	Pearson Correlation	0.784**	1	0.766**	0.700**	0.514**	0.456**	0.544**
	Sig. (2-tailed)	0.000		0.000	0.000	0.000	0.000	0.000
	N	581	581	581	581	581	581	581
FOMO	Pearson Correlation	0.707**	0.766**	1	0.646**	0.392**	0.516**	0.521**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000
	N	581	581	581	581	581	581	581
Social Validation factor	Pearson Correlation	0.653**	0.700**	0.646**	1	0.725**	0.660**	0.771**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000
	N	581	581	581	581	581	581	581
Novelty factor	Pearson Correlation	0.511**	0.514**	0.392**	0.725**	1	0.673**	0.752**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000	0.000
	N	581	581	581	581	581	581	581
Notification and reward systems	Pearson Correlation	0.405**	0.456**	0.516**	0.660**	0.673**	1	0.743**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000		0.000

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	N	581	581	581	581	581	581	581
Health Issues	Pearson Correlation	0.518**	0.544**	0.521**	0.771**	0.752**	0.743**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.000	
	N	581	581	581	581	581	581	581

**. Correlation is significant at the 0.01 level (2-tailed).

Starting with personal relevance, there is a moderate positive correlation with health issues (r = 0.518), indicating that the more personally relevant social media content is to a student, the more likely it is to contribute to health problems. This suggests that when students find content meaningful or closely tied to their identity, it can lead to increased engagement and potential negative health consequences, such as stress or anxiety.

Emotional content is also strongly correlated with health issues (r = 0.544), showing that emotionally charged content plays a significant role in the development of health problems. Social media that triggers strong emotional reactions, whether positive or negative, may heighten stress levels and exacerbate existing mental or physical health conditions among students.

FOMO (Fear of Missing Out) has a moderate correlation with health issues (r = 0.521), reflecting the anxiety and stress associated with constantly feeling out of the loop on social events or updates. This suggests that students who frequently worry about missing out on online interactions are more prone to experiencing health-related repercussions, such as sleep deprivation and mental exhaustion.

The most notable finding is the very strong correlation between the social validation factor and health issues (r = 0.771). This indicates that students who are heavily reliant on social validation—such as likes, comments, and shares—are at the greatest risk of experiencing negative health outcomes. This reliance on external validation can increase stress, lower self-esteem, and contribute to anxiety or depression as students become overly focused on their online presence and approval from peers.

Similarly, the novelty factor also shows a strong correlation with health issues (r = 0.752), suggesting that the constant desire for new and exciting content drives addictive behavior, which in turn leads to poor health outcomes. Students who are attracted to novel content may overconsume social media, leading to physical symptoms like fatigue and eye strain, as well as mental health issues.

Finally, notification and reward systems are correlated with health issues (r = 0.743). These systems, which play a central role in gamifying social media engagement, can create an addictive loop of seeking rewards, which may result in excessive use and the associated health problems.

The overall results reject the null hypothesis, indicating that there is indeed a significant correlation between social media addiction factors and health issues among college students. The strength of these correlations suggests that addiction factors such as social validation and novelty-seeking are key contributors to health-related consequences, providing valuable insights for developing interventions aimed at reducing social media addiction and improving student health.

4.1. Ranking Towards the Factors Influencing the Social Media Addiction

Based on the Friedman test results (see table 2), there is no significant difference in the ranks of the factors influencing social media addiction (Chi-square = 1.947, df = 6, p = .925). However, when looking at the mean ranks in ascending order, we can make the following interpretations and inferences.

Table 2. Factors influencing the Social Media Addiction

Ranks	Mean Rank
Personal relevance	4.05
Emotional content	4.04
FOMO	4.03
Social validation	4.01
Novelty	3.91

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Notification and reward systems	3.96
Dopamine release	4.01
Test Statistics[a]	
N	581
Chi-Square	1.947
df	6
Asymp. Sig.	0.925
a. Friedman Test	

The Friedman ranking for the Factors influencing the Social Media Addiction are ranked from 'Novelty' stood at first with the minimum mean score 3.91, followed by 'Notification and reward systems' stood at second with the mean score 3.96, 'Dopamine release' stood at third with the mean score 4.01, 'Social validation' stood at third with the mean score 4.01, 'FOMO' stood at fourth with the mean score 4.03, 'Emotional content' stood at fifth with the mean score 4.04, and finally 'Personal relevance' stood at sixth with the mean score 4.05. The Friedman ranking analysis of the factors influencing social media addiction revealed that novelty was perceived as the most influential factor for addiction, while personal relevance was perceived as the least influential.

4.2. Health issues

Null Hypothesis (H0): There is no significant association between the demographic variables and Health Issues

Inference: The results suggest that there is a significant association between some demographic variables and health issues. Specifically, the ANOVA results reveal that age, gender, and year in college have statistically significant effects on health issues, while course of study and locality of living do not. The p-values for age, gender, and year in college are 0.002, 0.003, and 0.003, respectively, indicating that the null hypothesis can be rejected in favor of the alternative hypothesis. The results also show that place of living has a significant effect on health issues, but with a higher p-value of 0.020 (see table 3).

Table 3. Association between the demographic variables and Health Issues

		Sum of Squares	df	Mean Square	F	Sig.
Age	Between Groups	69.569	31	2.244	1.951	0.002
	Within Groups	631.598	549	1.150		
	Total	701.167	580			
Gender	Between Groups	14.075	31	0.454	1.909	0.003
	Within Groups	130.586	549	0.238		
	Total	144.661	580			
Year in college	Between Groups	31.069	31	1.002	1.906	0.003
	Within Groups	288.700	549	0.526		
	Total	319.769	580			
Course of Study	Between Groups	13.376	31	0.431	0.918	0.597
	Within Groups	258.087	549	0.470		
	Total	271.463	580			
Place of living	Between Groups	27.706	31	0.894	1.614	0.020
	Within Groups	303.981	549	0.554		
	Total	331.687	580			
Locality of living	Between Groups	16.350	31	0.527	1.176	0.239
	Within Groups	246.317	549	0.449		
	Total	262.668	580			

4.3. Multiple Linear Regression Analysis

Null Hypothesis (H0): There is no significant linear relationship between the factors influencing the social media and Health Issues

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The R Square value of 0.724 indicates that 72.4% of the variance in health issues can be explained by the model, which includes six predictors: notification and reward systems, personal relevance, novelty factor, FOMO, social validation factor, and emotional contents (see table 4). This high R Square value suggests that the model provides a good fit to the data, accounting for a substantial portion of the variability in health outcomes. The Durbin-Watson statistic of 2.112 shows that there is little to no autocorrelation in the residuals of the model, meaning the errors are independent of one another—a necessary condition for a valid regression analysis.

Table 4. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.851a	0.724	0.721	3.13366	0.724	250.714	6	574	0.000	2.112

a. Predictors: (Constant), Notification and reward systems, Personal relevance, Novelty factor, FOMO, Social Validation factor, Emotional contents; b. Dependent Variable: Health Issues

Table 5 shows that the overall model is statistically significant, with an F value of 250.714 and a p-value of less than 0.0001. This implies that the independent variables collectively contribute to explaining the variance in health issues, leading to the rejection of the null hypothesis (H0), which states that there is no significant linear relationship between the factors influencing social media use and health issues.

Table 5. ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14771.804	6	2461.967	250.714	0.000a
	Residual	5636.575	574	9.820		
	Total	20408.379	580			

a. Predictors: (Constant), Notification and reward systems, Personal relevance, Novelty factor, FOMO, Social Validation factor, Emotional contents; b. Dependent Variable: Health Issues

The coefficients table (table 6) offers detailed insights into the contribution of each predictor to health issues. Among the factors analyzed, the social validation factor emerges as having the most significant impact, with a standardized Beta coefficient of 0.344 and a p-value of 0.000. This indicates a strong positive relationship between the need for social validation and health problems, suggesting that students who rely heavily on social media for validation (through likes, comments, shares) are more likely to experience adverse health outcomes, such as stress or anxiety. Additionally, the novelty factor shows a notable influence on health issues, with a Beta coefficient of 0.282 and a p-value of 0.000. This finding highlights how the pursuit of novel and exciting content can lead to excessive social media use, resulting in health problems like sleep deprivation or physical exhaustion. Another significant contributor is the role of notification and reward systems, with a Beta coefficient of 0.313 and a p-value of 0.000. These systems are designed to encourage frequent engagement, which can heighten the risk of negative health outcomes due to their addictive nature.

Table 6. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.326	0.635		5.241	0.000
	Personal relevance	0.018	0.042	0.017	0.442	0.659
	Emotional contents	-0.027	0.050	-0.023	-0.547	0.584
	FOMO	0.047	0.056	0.033	0.838	0.402
	Social Validation factor	0.469	0.056	0.344	8.349	0.000
	Novelty factor	0.305	0.040	0.282	7.733	0.000

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Notification and reward systems	0.350	0.037	0.313	9.352	0.000

a. Dependent Variable: Health Issues

On the other hand, factors such as personal relevance, emotional content, and Fear of Missing Out (FOMO) do not show significant effects on health issues in this model, as indicated by their non-significant p-values (greater than 0.05). This suggests that while these factors might play a role in social media addiction, they do not directly or substantially impact the health problems experienced by students in this study.

4.4. Findings of the Study

Overall, the findings suggest that the factors influencing social media addiction are positively correlated with The findings of this study provide significant insights into the relationship between social media addiction and the health issues faced by college students. The results demonstrate a clear positive correlation between various factors of social media addiction and adverse health outcomes. These findings are consistent across different statistical analyses, such as Friedman ranking, ANOVA, and multiple linear regression, which offer a comprehensive understanding of the impact that social media usage has on students' physical and mental well-being.

4.4.1. Key Findings from the Friedman Ranking and ANOVA Analysis

The Friedman ranking analysis highlights that novelty—the constant search for new and exciting content on social media—is the most influential factor driving addiction. This suggests that students who are more engaged with novel content are likely to spend more time on social media, contributing to addictive behaviors. On the other hand, personal relevance, or how much the content on social media is personally meaningful to the user, was ranked as the least influential factor in contributing to addiction. This implies that students may not become addicted solely due to finding content personally relevant, but more so due to the lure of fresh, exciting, or rewarding content.

The ANOVA results further indicate that demographic variables such as age, gender, year in college, and place of living may influence how individuals perceive and are affected by social media addiction. For instance, younger students or those who live on-campus might experience addiction differently than older students or those living off-campus, potentially due to differences in social dynamics, academic pressure, or access to alternative social activities. Gender differences may also play a role, with prior studies often indicating that females may be more vulnerable to social validation pressures, while males may be more drawn to novelty and gaming features on social media.

4.4.2. Insights from Multiple Linear Regression Analysis

The multiple linear regression analysis provides a more nuanced understanding of the specific predictors of health issues associated with social media use. It indicates that several factors—such as notification and reward systems, personal relevance, novelty factor, FOMO, social validation factor, and emotional contents—collectively predict health outcomes. Among these, the social validation factor, novelty factor, and notification and reward systems were found to have the strongest impact on health issues. This means that students who heavily rely on social media for validation, seek out new content frequently, or are constantly triggered by notifications are at higher risk for experiencing negative health effects such as anxiety, stress, sleep disturbances, or depression.

Interestingly, factors like personal relevance, emotional contents, and FOMO were found to have a non-significant impact on health issues in the regression analysis. While these factors may contribute to social media usage patterns, they do not directly predict health problems in this particular context. This highlights that the more habitual and psychologically ingrained elements of social media usage—such as seeking validation and being exposed to rewards or novel content—are more problematic for students' health than the actual emotional content or the fear of missing out.

5. Conclusion

In conclusion, the study shows a significant positive correlation between the factors influencing social media addiction and the health issues faced by college students. The study suggests that interventions to reduce social media addiction may improve the health outcomes of college students. The ranking of factors influencing social media addiction revealed that novelty was perceived as the most influential factor for addiction, while personal relevance was perceived

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as the least influential. Demographic variables such as age, gender, year in college, and place of living may play a role in the personal relevance of social media addiction. Furthermore, the study indicates that the factors influencing social media use may have an impact on individuals' health issues and may inform the development of interventions to address the negative effects of social media use on health. Therefore, colleges can take proactive steps to help students overcome social media addiction and regain their health aspects, including developing educational programs, encouraging offline activities, fostering a sense of belonging, monitoring and limiting access to social media, providing mental health services, considering demographic factors, and supporting research on social media addiction.

6. Declarations

6.1. Author Contributions

Conceptualization: M.H., S.S.M., dan J.S.; Methodology: S.S.M.; Software: M.H.; Validation: M.H., S.S.M., dan J.S.; Formal Analysis: M.H., S.S.M., dan J.S.; Investigation: M.H.; Resources: S.S.M.; Data Curation: S.S.M.; Writing – Original Draft Preparation: M.H., S.S.M., dan J.S.; Writing – Review and Editing: S.S.M., M.H., dan J.S.; Visualization: M.H. All authors have read and agreed to the published version of the manuscript.

6.2. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

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The authors received no financial support for the research, authorship, and/or publication of this article.

6.4. Institutional Review Board Statement

Not applicable.

6.5. Informed Consent Statement

Not applicable.

6.6. Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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